



U.S. Department  
of Transportation

**Research and  
Special Programs  
Administration**

400 Seventh Street, S.W.  
Washington, D.C. 20590

MAR 3 1 1999

Mr. Andrew N. Romach  
Corporate Regulatory Manager  
Radian International  
Post Office Box 13000  
Research Triangle Park, NC 27709

Ref. No. 98-0383

Dear Mr. Romach:

This is in response to your letter requesting clarification relating to lithium batteries under the provisions of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180).

Your questions have been paraphrased and answered as follows:

- Q1. In the United Nation's (UN) Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, the word "battery" means two or more cells which are electrically connected together by a permanent means. Is this definition applicable to the provisions specified in § 173.185?
- A1. Yes, the UN definition of a "battery" is applicable to the lithium battery provisions specified in § 173.185.
- Q2. If the Department of Transportation does not recognize this definition, how does DOT define the word "battery?"
- A2. See above response.
- Q3. Does the term "permanent means" include a soldered or welded connection, or a connection screwed together?
- A3. The term "permanent means" could include a soldered or welded connection, but not a connection screwed together.
- Q4. Would examples of a non-permanent means include metal clips or holders where the batteries could be removed easily?

173.185

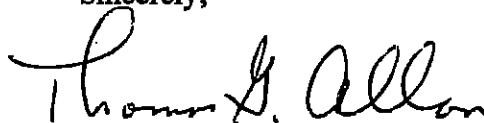
A4. Yes, metal clips or holders are considered a non-permanent means of attachment.

Q5. Does the enclosed diagram constitute one battery or many batteries, assuming the individual cells are clipped into battery holders so the cell can be removed readily?

A5. Based on your diagram, you have one battery containing 16 cells.

I hope this answers your inquiry. If you need additional assistance, do not hesitate to contact us.

Sincerely,

A handwritten signature in cursive script that reads "Thomas G. Allan". The signature is written in dark ink and is positioned above the printed name.

Thomas G. Allan

Senior Transportation Regulations Specialist  
Office of Hazardous Materials Standards



RADIAN INTERNATIONAL

A DAMES &amp; MOORE GROUP COMPANY

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§ 173.185Mailing Address:  
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December 23, 1998

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98-0383

Mr. Ed Mazzullo, Director  
Office of Hazardous Material Standards  
Research and Special Programs Administration  
U.S. Department of Transportation  
400 7th Street, SW  
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FAX: (202) 366-3012

Dear Mr. Mazzullo:

The manufacture and production of certain equipment containing lithium batteries is being delayed until DOT issues a regulatory response to the questions listed below. For this reason, I am asking for an expedited response from DOT to these questions.

I am writing to you to request a written regulatory interpretation concerning the applicability of the hazardous material regulations (HMR) to the following transportation scenario involving the shipment of lithium batteries contained in equipment. The piece of equipment in question contains a battery pack, which is comprised of eight single-cell lithium batteries configured in series and in parallel. Refer to the schematic in Figure 1.

Based on discussions with your DOT HAZMAT regulatory experts, a specific definition for "battery" is not provided in the HMR, including 49 CFR §173.185, where specific requirements for shipping lithium batteries and cells are found.

However, in 49 CFR §173.185(c), an exception is given for lithium cells and batteries that meet four specified criteria. The third criterion given in paragraph (c)(3) reads:

*(3) Each cell or battery is of the type proven to be non-dangerous by testing in accordance with tests in the UN Manual of Tests and Criteria, such testing must be carried out on each type prior to the initial transport of that type.*

In the UN publication referenced here, entitled *Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Second revised edition (United Nations, 1997)*, the following definition of "battery" is found in Section 38.3.3.2 on p. 364:

*Battery means two or more cells which are electrically connected together by a permanent means.*



I have several questions concerning lithium batteries:

- Does the DOT Office of Hazardous Material Standards apply the above UN definition for determining compliance with 49 CFR §173.185?
- If the DOT does not apply the above definition, how does DOT define battery?
- In the section on UN testing in the above-referenced manual, no further explanation of the term "permanent means" is given. In an effort to clarify the term "permanent means": Would examples of a "permanent means" include a soldered or welded connection, or a screwed together connection?
- Would examples of a "non-permanent means" include metal clips or holders where the batteries could be removed easily?
- Under the DOT's definition of a battery, would the attached schematic in Figure 1 represent one battery or many batteries, assuming the individual cells were clipped into battery holders where the cells could be removed readily?

I would appreciate your clarification of these issues. Thank you for your attention to this matter. If you have any questions concerning my request for clarification, please call me directly at (919) 461-1220.

Sincerely,



Andrew N. Romach  
Corporate Regulatory Manager  
Radian International

Cc: Carolyn Norris, Radian/RTP  
Brian Schimmoller, Radian/Austin



**Figure 1: Battery Pack Schematic**

